# LECTOTYPIFICATION OF *PASSIFLORA AFFINIS* (PASSIFLORACEAE) AND DISCUSSION OF ITS GEOGRAPHIC RANGE WITHIN THE UNITED STATES

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#### ABSTRACT

George Engelmann, in his description of Passiflora affinis, never designated a holotype for the species, nor has a lectotype been designated in subsequent literature addressing Engelmann's work or North American Passiflora. A lectoype is designated here and a discussion and clarification of the geographic range of this species in the United States is provided.

KEY WORDS: Passiflora affinis, lectotypification, geographic distribution. Ferdinand Lindheimer. George Engelmann, Charles Wright, Charles Parry, Benno Matthes

#### RESUMEN

George Engelmann. en su descripción de Passiflora affinis, nunca designó un holotipo para la especie, ni tampoco se ha designado un lectotipo en la literatura subsiguiente que trata el trabajo de Engelmann o las Passiflora norteamericanas. En este trabajo se designa un lectotipo, y además se hace una discusión y clarificación de la distribución geográfica de la especie en los Estados Unidos

#### INTRODUCTION

Passiflora affinis Engelm. is a warm-temperate and subtropical species of oakjuniper savannas and mesic woodlands from central Texas and northeastern Mexico (Schulz 1922; Killip 1938; Correll & Johnston 1970; Diggs et al. 1999). The type collection was made by Ferdinand Lindheimer in August to September 1849 at Comanche Spring, Bexar County, Texas. The type series was distributed in 1907 by the Missouri Botanical Garden as a part of a long-forgotten portion of the Flora Texana Exsiccata (Blankinship 1907), although it was originally described several decades earlier (Engelmann 1850a).

The labels distributed with the type series in 1907 (Fig. 1) are potentially misleading, presenting the type locality as "Comanche Spring; New Braunfels, etc.," Comanche Spring and New Braunfels occurring perhaps 30 miles apart. However, Engelmann (1850b), Blankinship (1907), Killip (1938) and Lindheimer correspondence with George Engelmann, found in the archives of the Missouri Botanical Garden, make clear that it was collected at Comanche Spring alone. Lindheimer spent the majority of the growing season of 1849 at that site, returning to New Braunfels only at the end of that year (Engelmann 1850b;

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# LINDHEIMER, FLORA TEXANA. (SUPPLEMENTARY TO "FLORA TEXANA EXSICCATA.") Distributed by the Missouri Botanical Garden.

# PASSIFLORA AFFINIS, ENGELM, Type Collection.

Collected by Lindheimer from 1849 to 1851. Comanche Spring; New Braunfels, etc. Aug.-Sept., 1849.

Fig. 1. The collection label found on specimens of the type series of *Passiflora affinis* distributed in 1907 (see Blankinship 1907), this label from a duplicate at GH.

Blankinship 1907). Comanche Spring was on the property of a friend of Lindheimer's, Baron Ottfried Hans von ("John O.") Meusebach, an early settler and founder of several communities in central Texas (King 1967). The spring was probably very close to Meusebach's house near the headwaters of Salado Creek, in what is now the Camp Bullis Military Reservation (Ivey 1979).

Although Englemann (1850a) did clearly state the type locality in the protologue, he did not designate a holotype, and neither Blankinship (1907) nor Killip (1938) later designated a lectotype from the *P. alfinis* type series.

Passiflora affinis Engelm., Bost. J. Nat. Hist. 6:233. 1850. (Fig. 2). Type: TEXAS. IBEXAR Co.] Comanche Spring, Aug-Sep 1849, *E Lindheimer 174* (LECTOTYPE, here selected: GHI; ISOLECTOTYPE: ARIZ, BMI, BRI, BRITSMUI, CJ, CANI, GI (2), GHI, KI, MEXU, MOJ, NYI, PL, PHJ, TEXU, UCJ, USJ, WD.

Liana, often suckering from roots, stems terete, glabrous, minutely puberulent to scabrous when young tendrils glabrous; stipules linear-setaceous, erect, glabrous, 0.1–0.2 cm; petioles glabrous, glandless, 0.4–4.5 cm; leaves glabrous, entire, shallowly to deeply 3(-5)-lobed, broadly ovate in general outline, basally cordate, truncate, to cuneate, 1-8(–10) cm long by 1.5-10(–14) cm wide, lobes ovate to obovate, rounded to truncate, entire to apiculate, often basally narrowed, laminar nectaries round, often in two obscure lines, each running from base of leaf near petiole apex toward the larger sinuses; inflorescence of two or rarely one flower per node, flowers fragrant, erect, stipe + pedicel 1.0–3.5 cm, slightly elongating in fruit; floral bracts glabrous, 3, occasionally deciduous, green to purple, linear-subulate to rarely ovate, 0.1–0.3 cm; flowers 3–5 cm in diameter; sepals moderately reflexed, lanceolate to linear-lanceolate, rounded



Fig. 2. The lectotype of Passiflora affinis at GH.

to acute, pale green to white, 1.0-1.6 cm long, 0.2-0.4 cm wide: petals moderately reflexed, linear-lanceolate, subulate, acute, pale green to white, 0.6-1.3 cm long, 0.1-0.2 cm wide; corona of 2 series of filaments, outer series linear-filiform, sinuous, weakly reflexed or not, tapering distally and terminating in a clavate apex, basally purple, apically green, white in between, 0.9-1.8 cm long, inner series filiform, erect, clavate, pale purple with green basally, 0.15-0.3 cm long; floral tube shallowly convex to nearly flat, operculum erect, incurved, plicate, pale purple to white, 0.1-0.2 cm long, nectar ring absent, limen erect, incurved, white, 0.1 cm wide; androgynophore 0.7-1.0 cm long, terete, pale purple; stamen filaments green with purple, 0.4-0.6 cm long; anthers green with purple margins, 0.25-0.4 cm long; ovary globose to subovoid, glabrous, styles purple, filiform, glabrous, 0.5-0.7 cm long, stigmas broadly expanded, round, 0.1-0.2 cm wide; berry, purple-black, ovoid, globose, to dorsiventrally compressed, 1.0-1.5 cm long, 1.0 cm wide; seeds dark brown to black, flattened, obovoid, acute, transversely sulcate, 0.25-0.35 cm long, 0.2-0.3 cm wide, with white arillate swelling to one side; germination epigeal.

It would be anticipated that a specimen chosen as the lectotype of an Engelmann name at the rank of species or below would be at the Missouri Botanical Garden where many of his collections reside, St. Louis, Missouri, being Engelmann's home from the early 1830s until his death in 1884 (White 1896; Yatskievych 1999). However, the protologue describes both flowering and fruiting material and none of the examined duplicates of this collection have flowers and fruit except for the specimen chosen as the lectotype at GH (Fig. 2). Most duplicates seen are sterile or have few fruit, the only other flowering specimen being at BRIT-SMU. All of the duplicates distributed in 1907 have massproduced labels numbered 817, whereas one of the two GH specimens, the one with flowers, has a much older, mostly hand-written label, numbered 174. Lindheimer had his own field numbers, whereas Englemann used separate numbers based on the distribution order of the Flora Texana Exsiccata following the Bentham and Hooker sequence (Blankinship 1907). Blankinship does note (p. 170) that 174 is the Lindheimer number, which corresponds to the Engelmann number 817, therefore these numbers refer to the same collection. The handwriting on the label of the now-lectotype is almost entirely Engelmann's, identifying the plant as Passiflora triloba. Elsewhere on the label and in the lower right-hand corner of the specimen is written "affinis" in what is probably Asa Gray's handwriting. In addition, this is the only specimen of the type series that indicates habitat information as it is cited in the protologue, stating that the plant was growing in "shady places" and "climbing high over trees." None of the series distributed in 1907 gives habitat details. The only detail in the label of the lectotype that differs from the protologue and the 1907 labels is the date, the older label stating "Sept 1849" whereas the protologue and newer labels state "Aug.-Sept. 1849" (Fig. 1). However, this does not make the older label incongruent with the protologue, and because of the other information on it and the presence of flowers on this specimen alone it is the best choice for the lectotype.

#### GEOGRAPHIC DISTRIBUTION

In Texas *P. affinis* is typically found growing over Cretaceous limestone or much less commonly over Precambrian igneous rock or late Tertiary sandstone and clay (Sellards et al. 1932; Spearing 1991). In northeastern Mexico (see specimens examined) it grows over Cretaceous limestone, shale and sandstone (Dirección General de Geografía del Territorio Nacional 1981a, b; Padilla y Sanchez & Aceves-Quesada 1992). The currently known distribution of *Passiflora affinis* in Texas is shown in Fig. 3, based on herbarium and literature surveys, indicating that it is nearly restricted to the southern Edwards Plateau and Lampasas Cut Plains (Diggs et al. 1999; Turner et al. 2003).

A population was once collected in Fayette County, Texas, by Benno Matthes (see specimens examined), representing the eastern range-limit of the species in the United States and in an area with different geology than where this species occurs elsewhere in Texas. Matthes, a German settler and naturalist in Fayette County, lived for a short period in the town of Round Top, where he collected several plant specimens from late 1853 until mid-1854 (Geiser 1941). In this area he apparently collected P. affinis (=Matthes 274), with specimens deposited at the Muséum National d'Histoire Naturelle, Paris and the Naturhistorisches Museum, Vienna (Killip 1938). This specimen still exists at P, but it was not found at W in a recent search, although W does have a fragmentary Matthes specimen of P. lutea labeled "bei No. 274," suggesting that the two species were probably growing together. Matthes initially outlined his botanical discoveries in this area, although without mentioning Passiflora (Matthes 1855a). He later provided a more detailed field account (Matthes 1861) where he mentioned finding at the upper margin of a riparian forest "Passiflora triloba" with "Clematis coccinea" and Cornus florida. This may have been to the southwest of Round Top near Cummins ("Cummings") Creek, along which he had been known to collect (Matthes 1855b, 1861). Although mesic forest edges are appropriate habitat for both *P. affinis* and *P. lutea*, such a habitat at the inner edge of the coastal plain may seem more appropriate for the latter species (e.g. Cooperrider 1995; Alford 2000) versus those of P. affinis on the Edwards Plateau and associated uplift. However, much of Fayette County, including the Round Top area, is underlain by sandstone and clay of the Catahoula and Oakville formations, both which can contain calcareous portions, particularly the latter (Sellards et al. 1932; Proctor et al. 1974). Furthermore, the springs in Fayette County are also known to be alkaline (Brune 1981). This suggests that much of Fayette County can provide habitats consistent with the primarily calciphilic preferences of P. affinis.



Fig. 3. Geographic distribution of *Passiflora affinis* in the United States based on herbarium surveys and floristic summaries (Diggs et al. 1999; Turner et al. 2003).

Killip (1938) reported the presence of *P. affinis* in New Mexico, citing a Parry specimen at US from Doña Ana county, labeled "chiefly in the valley of the Rio Grande, below Donana." This specimen was collected by the botanical survey party attached to the United States and Mexican Boundary Survey, consisting of John Bigelow, Charles Parry, Arthur Schott and Charles Wright (listed on the collection label as "C.C. Parry, J.M. Bigelow, C. Wright, & A. Schott", see specimens examined). However, the only *P. affinis* collection cited in the botanical report of the Boundary Survey is by Bigelow in October (but with no year given) along the Devils River (Torrey 1859) in what is now Val Verde County, Texas, perhaps 350 miles from Doña Ana County, New Mexico. The Boundary Survey travelled within close proximity to the Rio Grande for several hundred miles south and west of Doña Ana County after the Treaty of Guadalupe Hidalgo

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was signed with Mexico in 1848, following the end of the Mexican-American War (Emory 1857). Therefore it should not have been assumed that this specimen was collected within the present boundaries of New Mexico.

In contrast, Killip (1938) did not similarly interpret the vague labels of *P. affinis* specimens collected by Charles Wright to suggest that this species occurred in New Mexico. Three collections could have been interpreted as such, one at GH (Wright 217) labeled "from Western Texas to El Paso, New Mexico, May to October 1849," another at GH and US with the same information but numbered 218, and another with no number at NY and PH labeled "N. Mexico, 1851" (see specimens examined). It is surprising that they were not, with El Paso attributed to New Mexico in two of these three collections and "N. Mexico" also potentially interpreted in the same way, or as "northern Mexico."

Wright's number 217 is actually a distribution number given by Asa Grav for his Plantae Wrightianae part I (1852), whereas Wright's field number corresponding to 217 was 404, collected on the 9th of June, 1849. His travel route (Geiser 1935) and his field notes, summarized in Shaw (1987) and available in the Gray Herbarium archives at Harvard University, indicate that 217/404 was collected "on the banks of the Leona" close to present-day town of Uvalde, Texas. Wright 218 was the distribution number for Wright's field number 734, collected on the 25th of July 1849, among the "hills of the Devil's River" in presentday Val Verde County, Texas, although Gray (1852) consistently referred to the Devils River as the "San Pedro River", following the geographic names used by French (1850; Shaw 1987). Wright's "N. Mexico, 1851" may be the same as that referred to by Gray (1853), collected "on the Sabinal, western Texas, July," in what is now Uvalde County. However, Grav (1853) gives no distribution number for this specimen. In Wright's 1851 field notes in the GH archives Passiflora is entered only twice, once having been found on Chicon Creek (in modern Zavala County, Texas) in May 1851 and another time found in the "mountains near Santa Cruz, climbing among rocks," in Sonora, Mexico, July 1851, with no mention of the genus in his 1852 notes. The Chicon Creek Passiflora matches the entry in Gray (1853) for P. tenuiloba and the Santa Cruz specimen matches the entry (and protologue) for P. inamoena (=P. bryonioides Kunth). In July 1851 Wright was hundreds of miles away from the Sabinal River, in the vicinity of El Paso and southwestern New Mexico (Shaw 1987). It is possible that he collected this P. affinis specimen in this area, but without entering it into his field book, although that seems unlikely because he was a fastidious note-taker during his explorations of the border region. The only time he appeared to relax his notetaking was at the end of his travels in 1852, on his return to San Antonio, when on July 2nd he records his final collection in what is now western Crockett County, Texas (Shaw 1987), over 100 miles to the northwest of the Sabinal River in Uvalde County. It seems probable that Wright collected this specimen not in 1851 but in 1852, east of Crockett County on his return to San Antonio, which

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would have taken him through present-day Uvalde County. Shaw (1987) mentions that these post-July 2, 1852 notes tend to be folded-up in the fragment folders of the specimens themselves. Such notes tend to be only with GH specimens because of Wright's professional association with Gray. No duplicate of this specimen exists at GH so such information is probably lost. Furthermore, Gray often cut up notes and correspondence to make into fragment folders (W. Kittredge, pers. comm.). Thus if these notes still exist at GH they may form a packet on one of the over five million specimens in the herbarium.

These three Wright collections and the single Parry collection were obtained within what is currently west-central Texas, some of this area having been included in a southeastward extension of the Mexican province of New Mexico prior to the signing of the Treaty of Guadalupe Hidalgo (Commons 1990). Thereafter, all that is presently part of modern Texas was considered to be within the United States, Texas having claimed most of what is now modern New Mexico, northward through parts of Colorado and Kansas, into Wyoming, this land later purchased from Texas by the United States in the Compromise of 1850 (Stephens & Holmes 1988; Beck & Haase 1989). With these Parry and Wright collections made after Guadalupe Hidalgo in an area that has subsequently been considered to be part of Texas only, any interpretations in herbarium labels or in the literature of these collections having come from New Mexico or northern Mexico are in error.

Despite the potentially misleading labels on these specimens, *P. affinis* has never been reported from modern New Mexico in any floras of that state, which is fortuitous because a similar situation with vague herbarium labels may have led to the potential misreporting of *P. tenuiloba* for New Mexico (Martin & Hutchins 1981). Therefore, it can be assumed that the geographic range of *P. affinis* is restricted only to central Texas, with scattered populations in north-castern Mexico. The potential confusion created by old, vague labels, can lead to floristic uncertainty and this alone should be an inspiration to all botanists to be extremely thorough in making their collection labels.

Specimens examined: MEXICO. Nuevo Leon. Mcpo. Lampazas de Naranjo: Rancho Resendez, Lampazas, 22 Jun 1937. M.T. Edwards 298 (GH). Mcpo. Monterrey: Monterrey: Monterrey Sierra Madre Oriental, 23 Jul 1933. C.H. Mueller & M.T. Mueller 100 (GH) Mcpo. Santiago: trail between Potrero Redondo &z Las Ajuntas, 24 Aug 1939. C.H. Muller 2955 (GH). Tamaulipas Mcpo. Cruillas: Vic. of El Milagro, Cerro Zamora. 22 Aug 1930. H.H. Bartlett 1/094 (GH) Mcpo. Vietoria: 12mi W of Victoria. 28 Aug 1948. Kenover & Crun 3366 (GH)

U.S.A. TEXAS: Bexar Co.: Comanche Spring, New Braunfels etc., Aug-Sep. 1849, F. Lindheimer 817 [-174] (ARIZ, BM, BR, BRT-SMU, C, CAN, G [2], GH [2], K, MO, NY, P. PH, TEX, UC, US, W), San Antonio, TO cti 1920, ED, Schulz +01 (US), Edwards Co.: Devils Sink Hole, 29 Sep 1940, VL, Cory 35652 (GH); 39mi S, of Sonora, 16 Aug 1941, VL, Cory 38039 (GH); Devil's Sink Hole, 10mi E, of Rock Springs, 24 Jul 1946, D.S. Correll 13412 (BRIT, NY), 10mi SE of Carta Valley, 7 Aug 1965, D.S. Correll 31537 (GH), Fayette Co.: no locality, no date, B. Matthes 274 (P), Gillespie Co.: 3mi E of farm road, 1mi s, of county line off rt. 16, 20 Jul 1967, D.S. Correll & H.B. Correll 34292 (GH), Hays Co.; San Marcos

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and vicinity, Jul 1897, S.W. Stanfield s.n. (NY); lake bank, San Marcos, 25 Jul 1941, B.C. Tharps.n. (BRIT, GH, NY, PH, US). Kerr Co.: Hunt, shores of Guadalupe River, 4 Aug 1969, P. Fryxell 1099 (NY). Kimble Co.: Telegraph, 8 Oct 1916, E.J. Palmer 10942 (US); along Llano River at Junction, 6 Sep 1965, D.S. Correll 31527 (GH). Kinney Co.: Ft. Clark, 10 May 1893, E.A. Mearns 1439 (US); 10 3/4mi W of Laguna, 24 Sep 1939, V.L. Cory 33461 (GH). Llano Co.: Enchanted Mt., Fredricksburg, 26 Jun 1932, C.C. Alberssn. (BRIT); Enchanted Rock, 1 Aug 1938, B.C. Tharp s.n. (NY). Sutton Co.: 3/4mi SW of Ft. Terrett, 20 Aug 1937. V.L. Corv 24090 (GH), Travis Co.; above Zilker Park, Austin, 10 Oct 1945, B.C. Tharp 45-49 (GH, NY); Hamilton Pool, 8 Jul 1966, J.R. Crutchfield 1802 (NY); Austin, 27 Aug 1978, J.M. MacDougal 448 (US). Uvalde Co.; from Western Texas to El Paso, New Mexico, Mav-Oct 1849, C. Wright 217 (GH [2]); N. Mexico, 1851, C. Wright s.n. (NY, PH). Val Verde Co.: chiefly in the valley of the Rio Grande, below Donana. no date, C.C. Parry, J.M. Bigelow, C. Wright, & A. Schott s.n. (US); from Western Texas to El Paso, New Mexico, May-Oct 1849, C. Wright 218 (GH [2], US). Undetermined locality: Nueces, 1880s, V. Havard s.n. (US). CULTIVATED: Cornell University, originally from U. Texas, San Antonio, 17 Jun 2001, D. Goldman 1769 (BH); Cornell University, originally from U. Texas, San Antonio, 10 Aug 2001, D. Goldman 1819 (BH), Cornell University, originally from U. Texas, San Antonio, 9 Sep 2001, D. Goldman 2126 (BH); Cornell University, originally from Edwards Co., TX, 9 Sep 2001, D. Goldman 2127 (BH); Cornell University, originally from U. Texas, San Antonio, 28 Sep 2001, D. Goldman 2160 (BH); Cornell University, originally from U. Texas, San Antonio, 2 Nov 2001, D. Goldman 2161 (BH); Cornell University, originally from U. Texas, San Antonio, 2 Nov 2001, D. Goldman 2162 (BH).

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